

PATENT SPECIFICATION



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COMPLETE SPECIFICATION.

Improvements in Machine Vices.

I, EDWARD CHESHIRE, Engineer, a citizen of the United States of America, whose post office address is Berlin Township, County of Waukesha, State of Wisconsin, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improvements in machine vices of the type which are more particularly adapted for use in connection with sawing and trimming slugs, mitering borders, and sawing and trimming cuts or electrotypes for printers' use.

Heretofore all trimming saw devices have been arranged for receiving the work at the rear or saw approaching side of the retaining gauge. As a result thereof, the saw in cutting into a plurality of gripped slugs, borders, cuts or electrotypes, pulls each advance slug or the like away from its next succeeding slug and permits burrs to enter between the adjacent slugs, thereby causing the material to become spread out at the sawed edge, resulting in the type assuming irregular or non-parallel lines.

Again, the gripping mechanisms used heretofore have been deficient in that the ribbed material when clamped had a tendency to, and much of the time did, cause a "fanning" action of the material at the edge opposite the sawed edge. This "fanning" action causes the advance end of the material to skew or feed further into the saw, resulting in the material being cut on a bias and some of the type being cut off of some of the lines.

The principal object of the invention is to provide simple, safe, durable and efficient mechanism including means for adjusting the table to meet different requirements, means for properly gauging the material to be cut, mitering

means and clamping means, all simple in construction and accurate and clean in operation, and cooperating in an improved manner to meet all of the commercial requirements.

The invention consists in a machine vice of the type referred to, wherein the material to be treated by the cutting means is retained in place on the supporting table by means comprising relatively movable work holding members provided with interlocking portions which are adapted to be forced into cooperative engagement by wedge means, one of the work holding members having a fixed jaw portion extending horizontally therefrom and supporting a work positioning gauge, while the other of said members is arranged to move within the first mentioned member in a direction parallel to the line of movement thereof.

The invention also consists in a vice according to the preceding statement in which the work positioning gauge is formed with a recess to accommodate a portion of the fixed jaw of the work holding member.

The invention further consists in a vice according to the preceding statement but one, in which the work holding members are arranged within a guide groove formed in the supporting table and extending parallel to the cutting means.

The invention still further consists in a vice according to the preceding statement but two, in which one of the relatively movable members is provided with a toothed portion which is adapted to be engaged by a toothed member for moving the work holding members into clamping relation with each other. Preferably said tooth member is formed with an inclined portion which is engaged by a wedge member to force said toothed member into operative engagement with the toothed portion provided on one of the relatively movable members: while said wedge member is preferably tiltingly

retained in position by means of a spring actuated plunger.

The invention furthermore consists in a vice according to the first one of the preceding statements, in which a plurality of gauge members are arranged to be relatively adjustable with respect to each other to compensate for wear of the cutting and trimming means and for determining a zero position.

The invention moreover consists in a vice according to the first one of the preceding statements, in which means is provided for clamping material in a position inclined to the saw for mitering said material, which means comprises a main body portion having an inclined edge and a member pivotally connected to said body portion and movable into a position to clamp material to be mitred between said inclined edge and said pivotally mounted member.

The invention lastly consists in a machine vice of the type referred to, constructed and operable substantially as hereinafter described.

Referring now to the accompanying drawings:—

Figure 1 is a side view of the upper portion of the improved machine vice in combination with a trimming saw;

Figure 2 is a top view thereof, parts broken away to show interior construction, the view also showing slugs in position to be sawed and trimmed;

Figure 3 is an enlarged vertical sectional view taken on line 3—3 of Figure 2;

Figure 4 is a sectional detail view taken on line 4—4 of Figure 2;

Figure 5 is a top view of a portion of the table showing the mitering attachment mounted thereon;

Figure 6 is a perspective view of a portion of the mitering attachment showing the clamping member in open position;

Figure 7 is a vertical sectional view taken on line 7—7 of Figure 2;

Figure 8 is a transverse sectional view taken on line 8—8 of Figure 3, part of the casing being shown in elevation;

Figure 9 is a transverse sectional detail view taken on line 9—9 of Figure 2, and including another micrometer adjustment means; and

Figure 10 is a top detail view of some of the slugs and a portion of the movable clamp.

Referring to the drawings, it will be noted that my invention is disclosed in connection with saw mechanism including a cored tubular standard 10, upon the upper and side portion of which are mounted horizontal bearings 11 having a shaft 12 journaled therein. The shaft 12

between the bearings is provided with a pulley 13 which is driven through any suitable belt 14. The inner end of the shaft, which terminates above a medial portion of the standard, has mounted thereon a circular saw 15.

The side of the standard 10 opposite to the bearings 11 is formed with vertically extending guide ribs 16 between which is positioned a supporting bracket 17 carrying a horizontally extending table 21 shaped to extend in part on both sides of the saw. This table is provided in its upper surface with an elongated guide groove 22 of rectangular form in cross section which extends adjacent to and parallel with the outer side face of the saw 15.

Within the guide groove 22 is positioned a slidable work member 23 which is formed with a rabbeted or recessed portion 24 in which is slidably mounted a clamping jaw member 25 having upstanding clamping portions 24¹ and 25¹. The slides or clamping bar members 23 and 25 both pass under the gauge or jaw member 38, making a compact and efficient arrangement. The clamping bar or jaw member 25 is of elongated form and its upper edge along its rear end portion is provided with upwardly and forwardly extending angular rack or saw teeth 26 which are engaged by a complementary member 27 having downwardly and rearwardly extending angular rack or saw teeth 27¹, so that as member 27 moves downwardly it will also move rearwardly. A frame or casing 28 extending over the member 27 and mounted on the slidable work member 23 is provided with a downwardly and rearwardly extending guide portion 29 which is engaged by the forwardly and upwardly angled portion 30 of the complementary member 27. The forward end 31 of the complementary member 27 is angled downwardly and forwardly and is engaged by a wedge block member 32 which is positioned between an end wall of the casing 28 and the angular end 31 of the complementary member 27. The wedge block 32 is formed with a rear edge 32¹ which co-acts with the angled portion 31 to move the complementary member 27 downwardly and rearwardly when the wedge block is pushed downwardly.

In moving downwardly the rack teeth of the complementary member 27 will engage the rack teeth of the clamping jaw member 25 and draw said member rearwardly to a clamping position as shown in Figure 3. A coiled spring 33 extending around a lug 34 projecting from the inner surface of one of the cas-

ing walls has one end 33¹ connected to the casing and the other end 35 connected to the complementary member 27 to move said member 27 forwardly and upwardly when the wedge member 32 is moved upwardly into a releasing position. The upward movement of the complementary member 27 permits the free movement of the clamping jaw member 25 to any adjusted position.

A bell crank lever 36 fulcrumed in the casing 28 has its shorter arm connected to the wedge member 32 by a pin and slot connection 37 to raise and lower said member. A stop lug 36¹ formed on the bell crank lever cooperates with a portion of the casing to limit the movement of said lever in releasing the clamping member 32. A spring-pressed plunger 28¹ slidably mounted in a socket in the casing 28 is yieldably pressed against a projection 36^a on the lever 36 for yieldably holding the latter in adjusted position, thereby also preventing work from rattling loose. When the lever 36 is in its central or released position, the projection 36^a is in a central position with respect to the plunger 28¹. However, when the lever 36 is moved forwardly the projection 36^a moves upwardly whereby the leverage of the spring-pressed plunger 28¹ on the lever 36 is increased for increasing the locking action of the lever 36 and wedge 32 in clamping position.

A relatively fixed upstanding jaw or gauge 38 is mounted firmly on the slidable work member 23 and extends at right angles therefrom to the outer side edge of the table 21. The work to be cut is clamped between the fixed jaw 38 and the movable jaw 25. Said fixed jaw has an elongated recess 39 formed in its front face to receive an adjusting screw 40 which extends approximately the full length of the fixed jaw and through the outer end thereof, and its outer end is provided with a milled head 41 for convenience in rotating the screw. The screw adjacent the head is also provided with an adjustable collar 42 having a scale delineated thereon to indicate the degree of rotation of said screw. A set screw 42¹ locks the collar on the screw.

In order to accurately gauge the length of slugs or other parts to be cut, the upper surface of the fixed jaw 38 is formed with or has mounted thereon a graduated scale 43, and is provided with a co-acting side gauge arm 44, the working face 44¹ of which extends forwardly at right angles from the front face 38¹ of the fixed jaw 38. Said arm 44 is formed with a rectangular recess or groove 45 in its under side so the arm will fit and slide

over the fixed jaw 38 and be guided thereby and retain its right-angular position with relation thereto. The arm 44 is also provided with a spring-pressed plunger 46 having a section of a nut 47 mounted on its inner end which is engageable with the adjusting screw 40 within the fixed jaw 38. A coiled spring 48 normally holds the nut in threaded engagement with the screw and a lever 49 pivotally connected to the outer end of the plunger 46 and bearing medially on a fulcrum 50 provides for manually disengaging the nut section 47 from the screw 40 when it is desired to quickly adjust the gauge 44 along the fixed jaw 38 preparatory to the micrometer adjustment with the milled nut 41 and the scaled index collar 42. It will be noted that all slugs in common use are tapered and formed with vertical ribs 51¹ (see Figure 10), and that the portions 34¹ and 25¹ of the movable jaw 25 are of greater width than the distance between the ribs to prevent the slugs rocking on said ribs and to make possible a firm grip when in clamped position. In this way "fanning" action of the material is overcome.

In using the portion of the machine thus far described, the linotype slugs 51 or other parts are placed on the table between the fixed and movable jaw and the movable jaw is advanced to lightly engage the slugs. With the outer edges of the slugs firmly pressed against the movable gauge arm 44, the latter is then adjusted for cutting or trimming the slugs the desired amount, the micrometer screw 40 being adjusted for precision of measurement if necessary. When properly arranged the lever 36 is pulled forwardly to clamp the slugs firmly in adjusted position and the whole slidable unit, which might be termed a slidable vice, is manually pushed rearwardly to permit the circular saw to cut the end portions of the slugs at right angles to their length. When the operation is completed the vice is pulled forwardly and the slugs are released by pushing the clamping lever 36 rearwardly, whereupon the operation may be repeated. The material to be cut being at the front side of the main gauge 38 and being firmly clamped, it is made possible to overcome the pull of the saw which separates adjacent pieces of material and causes the material to become spread out at the sawed edges, and also prevents burrs being injected between adjacent pieces of material. "Fanning" also is prevented.

As the waste portions are cut, they will drop on an inclined portion 21¹ of the

table and be deflected therefrom to a waste receptacle (not shown) placed below.

- 5 A saw guard 52 extending over the upper portion of the saw protects the operator against accidental injury. Said guard is connected to the rear portion of the table by a pivot bolt 53 to permit the guard to be easily raised from the saw, and a projecting lug 52¹ limits the downward covering movement of said cover.

- 10 As it is almost impossible to replace the cutters after being sharpened in exactly the same position for accurate work with relation to the micrometer adjustment scales of the gauges, this invention provides for re-calibrating the parts in a very simple manner as follows:—

- 20 A number of slugs are clamped in the machine and cut and planed to determine zero position, and while still held by the clamp, the working face 66¹ of a gauge 61 is moved to engage the cut ends of the slugs and when in engagement there with a collar 67¹ of the micrometer screw 67 is loosened and turned to register zero and its set screw 68 is then turned to lock the collar in adjusted zero position. The slugs are now removed and the movable clamping jaw moved outwardly to permit the gauge arm 44 to be moved so that its working face 44¹ will engage the working face 66¹ of the gauge 61. The collar 42 is then loosened and turned to indicate zero position and its set screw 42¹ is then turned to lock the collar to the shaft. When thus adjusted to zero position the parts and the scales all bear a fixed relation to the plane of cut of the cutters and threads of the gauge screws and the thickness in points of the slugs.

- 40 The gauge screw 67 also has a certain pitch with relation to cutting the slugs at a miter so that the gauge 61 may be adjusted a certain number of points corresponding to the point thickness of the slugs to exactly miter the slug ends from the corner ends without shortening the slugs.

- 50 The construction also permits trimming the side portion of the slugs or cutting off the ribs thereof. To accomplish this, the slug is placed between the relatively stationary jaw 38 and the vertically arranged overhanging portion 25¹ of the movable jaw 25 in endwise relation and then clamped in the manner before described after being properly positioned by the gauges. When clamped in position the vice is pushed toward the saw to have the side portion removed by the cutters or the saw and the cutters.

- 60 In mitering borders or cutting off slugs or other parts at forty-five degree, or

other, angles, a mitering attachment (see Figures 5 and 6) is provided which comprises a body portion 54 having a straight face 54¹ which bears against the front face 38¹ of the fixed jaw and a work-holding face 55 extending at the desired angle, it being a forty-five degree angle with relation to the face 54¹ in this particular instance. The slidable work member 23 is provided with an aperture 56 (see Figure 3) adjacent the fixed jaw to receive the downwardly extending dowel pin 57 of the body part which holds said part in position on the bar 23. The body part is also provided with a fixed horizontally extending guide rod 58 on which is slidably and pivotally mounted the outer end of a clamping member 59. The guide rod 58 extends at right angles to the face 38¹ of the fixed jaw 38 so that the clamping member 59 is movable toward and away from the said fixed jaw 38 and the angular surface 55 of the attachment 54. The free end of the clamping member 59 is formed with a downwardly extending lug 59¹ having an angular inner face 60 which is parallel to the face 55 when the arm is swung into clamping position, as illustrated in Figure 5. When in clamping position the free end of the arm 59 is engaged by the clamping jaw portion 25¹ and clamps the slugs 51¹ interposed between said lug 59¹ and the face 55 of the body part 54. Said clamping action is controlled by the movement of the bell crank lever 36 before described.

In order to properly aline the slugs 51¹ endwise, the adjustable gauge 61 is used. It includes an angular body portion 62 removably secured to the side edge of the table by a thumb screw 63. The upper portion of said gauge is formed with a tubular part 64 in which is slidably adjustably positioned the shank 65 of the adjustable gauge plate 66. The working face 66¹ of the gauge plate is parallel to the side portions of the saw and the ends of the slugs are adapted to abut against said plate before being clamped in position. A micrometer screw 67 threaded into the shank 65 of the gauge and journaled in the body portion provides for adjusting the gauge plate toward or away from the line of cut of the saw. Said screw 67 is provided with a collar 67¹ having a scale 68 delineated thereon indicating points of thickness of slugs to be mitered.

It is my intention to cover all modifications of the invention falling within the spirit and scope of the following claims.

Having now particularly described and ascertained the nature of my said inven-

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tion and in what manner the same is to be performed, I declare that what I claim is:—

1. A machine vice of the type referred to, wherein the material to be treated by the cutting means is retained in place on the supporting table by means comprising relatively movable work holding members provided with interlocking portions which are adapted to be forced into cooperative engagement by wedge means, one of the work holding members having a fixed jaw portion extending horizontally therefrom and supporting a work positioning gauge, while the other of said members is arranged to move within the first mentioned member in a direction parallel to the line of movement thereof.

2. A vice according to Claim 1, in which the work positioning gauge is formed with a recess to accommodate a portion of the fixed jaw of the work holding member.

3. A vice according to Claim 1, in which the work holding members are arranged within a guide groove formed in the supporting table and extending parallel to the cutting means.

4. A vice according to Claim 1, in which one of the relatively movable members is provided with a toothed portion which is adapted to be engaged by a toothed member for moving the work holding members into clamping relation with each other.

5. A vice according to Claim 4, in which the toothed member is formed with an inclined portion which is engaged by a wedge member to force said toothed member into operative engagement with the toothed portion provided on one of the relatively movable members.

6. A vice according to Claim 5, in which the wedge member is yieldably retained in position by means of a spring actuated plunger.

7. A vice according to Claim 1 in which a plurality of gauge members are arranged to be relatively adjustable with respect to each other to compensate for wear of the cutting and trimming means and for determining a zero position.

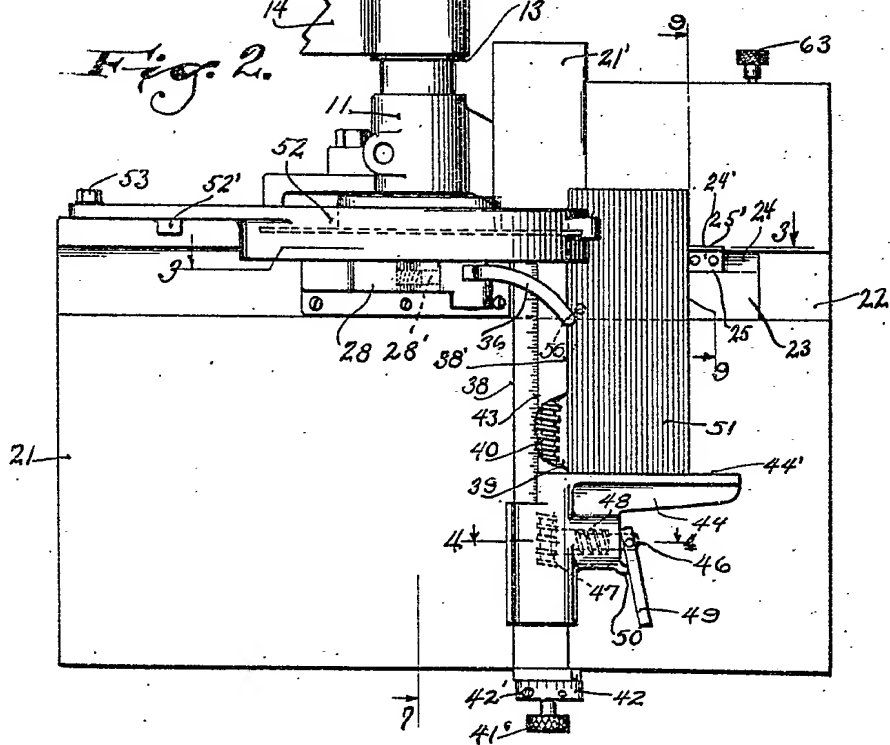
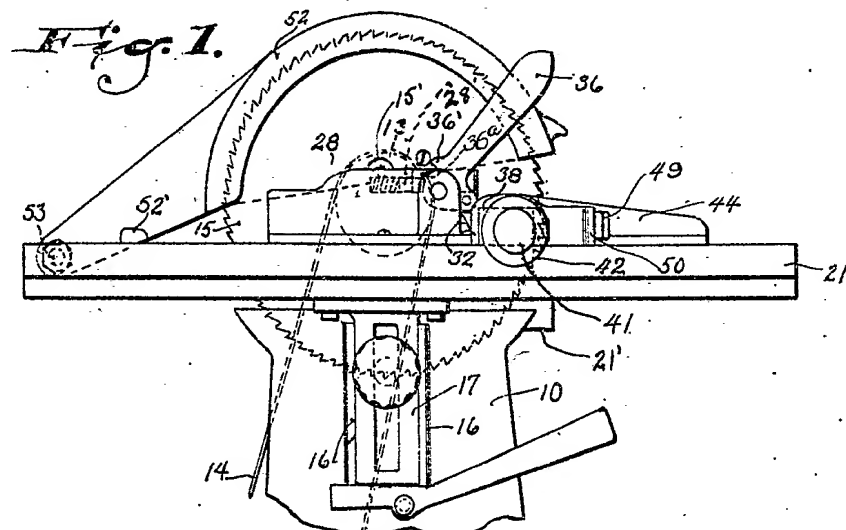
8. A vice according to Claim 1, in which means is provided for clamping material in a position inclined to the saw for mitering said material, which means comprises a main body portion having an inclined edge and a member pivotally connected to said body portion and movable into a position to clamp material to be mitred between said inclined edge and said pivotally mounted member.

9. A machine vice of the type referred to, constructed and operable substantially as hereinbefore described with reference to the accompanying drawings.

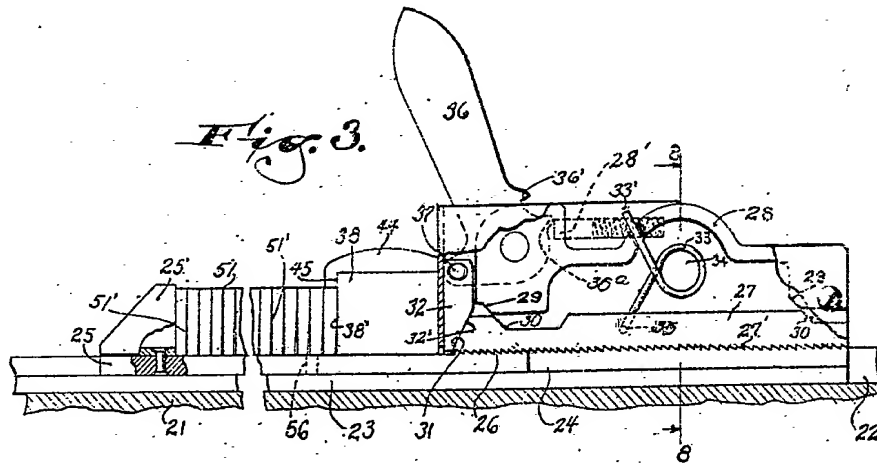
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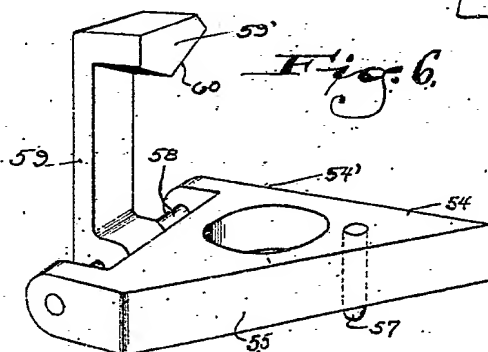
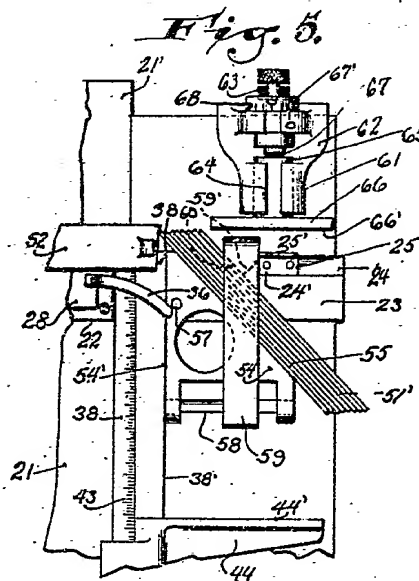
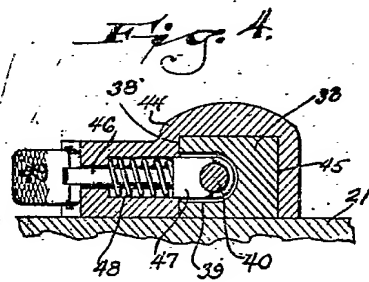
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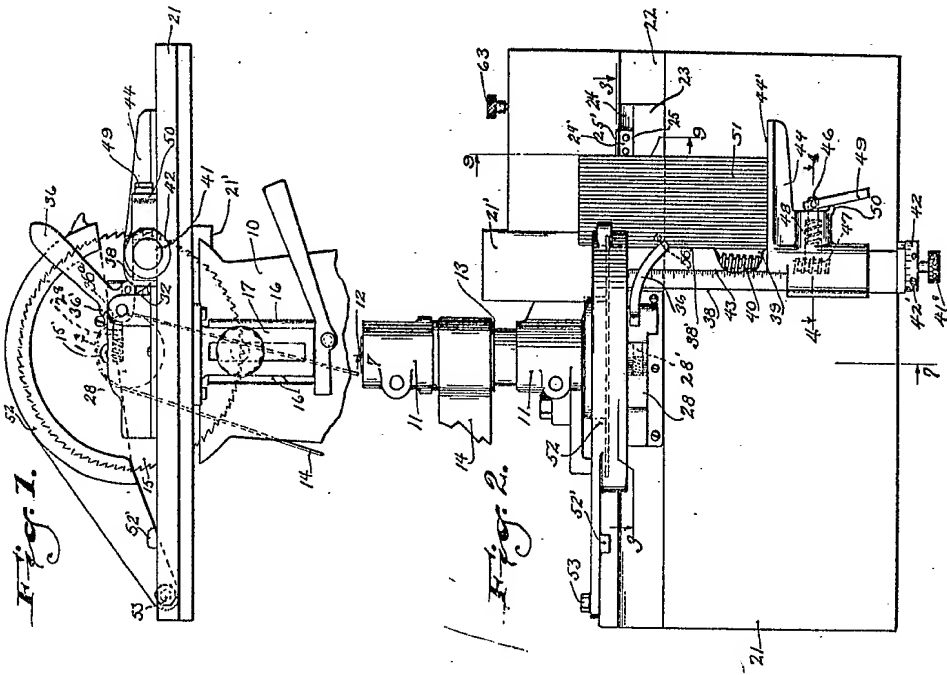


Fig. 1.

Fig. 2.

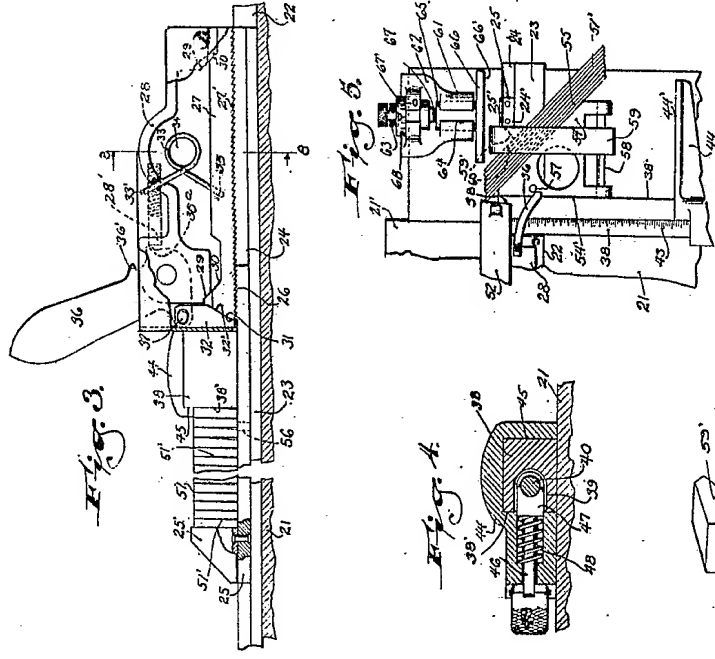
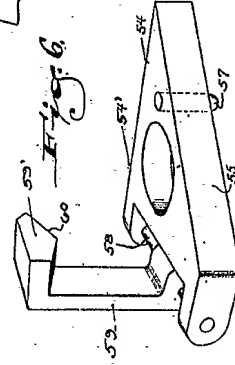


Fig. 3.

Fig. 4.

Fig. 5.



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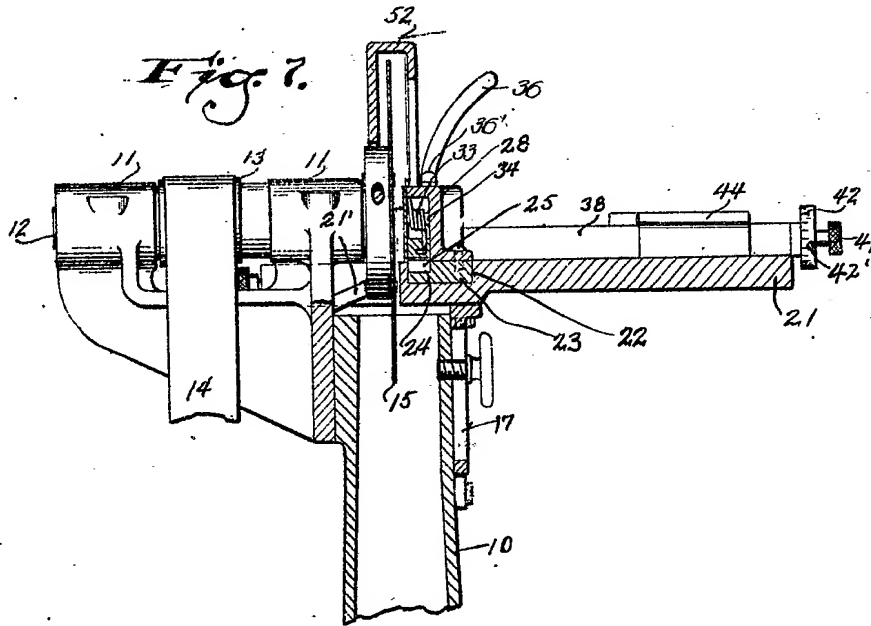


Fig. 8.

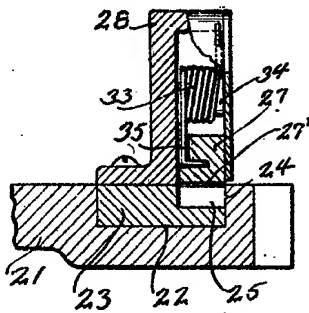


Fig. 10.

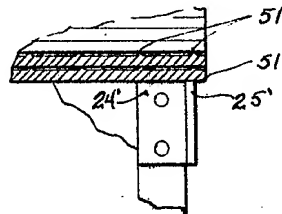


Fig. 9.

